Ontario

Ontario Ministry of Agriculture, Food and Rural Affairs

2001 SUPPLEMENT

Fruit Production Recommendations

Publication 360S

CHANGES/ADDITIONS/DELETIONS TO CHAPTERS 7–10

CROP	PEST	TIMING & PG #	CHANGE	COMMENTS
Refer to product label for re-entry and days to harvest				
Apple	Powdery mildew	Half inch green to tight cluster (pg. 52)	**Add:** Kumulus DF at 22.5 kg/ha	Use of Sulphur or Kumulus may result in elevated populations of red mite and scale insects.
	Powdery mildew	Half inch green to tight cluster (pg. 52)	**Correct:** rate of Dikar WP from 7.50 to 6.75 kg/ha	
	Tentiform Leafminer	Petal fall (calyx) (pg. 53) and first summer spray (pg. 54)	**Add:** Agri-mek 1.9 EC at 750 mL per ha	Apply when first sap-feeding mine on underside of fruiting spurs is detected. Apply Agri-mek no later than 21 days after petal fall for best results. Apply with 10 L Superior oil and a minimum of 1000L of water/ha. Agri-Mek plus oil may cause russeting to Golden Delicious and other light-skinned cultivars. Do not use within 14 days of a captan application. Do not apply more than once a season. Agri-mek is best applied alone.
	Obliqueband ed leafroller	Full pink (pg. 53), Petal fall (pg. 54), Special sprays (pg. 56).	**Change:** Dipel WP at 2.25 kg/ha to Dipel 2X DF at 1.12 kg/ha	
	Scab	Half inch green to tight cluster (pg. 51)	**Change:** comment in material column to read "Use one of the fungicides listed at Green Tip **(exception: use Vangard** only pre-bloom)	
	Scab	Half inch green to tight cluster (pg. 51)	**Add:** Sovran at 240 g/ha	Sovran represents a new family of fungicides called Strobilurins. Sovran has good protectant, post-infection and antisporulant activity on apple scab and powdery mildew. Do not use sovran earlier than tight cluster and apply in blocks of 2 applications, 10 days apart. Because of its mode of action, it is important to follow resistance management strategies carefully. Use another chemical family for 2 applications before returning to Sovran. Use no more than 4 applications of Sovran per season. After the last application of Sovran tissue is protected from infection for 5–8 days. In conditions of rapid growth, shorten intervals between applications. Sovran is phytotoxic to some varieties of sweet cherries. Check label for details.

CROP	PEST	TIMING & PG #	CHANGE	COMMENTS
Apple (cont'd)	Powdery mildew	Half inch green to tight cluster (pg. 52)	**Add:** Sovran at 240 g/ha	See Sovran comments for scab at half-inch green to tight cluster.
	Scab	Green tip up to half inch green (pg. 51)	**Change:** Maestro 75 DF at 4 kg/ha to Maestro 80 DF at 3.75 kg/ha	
		Half inch green to tight cluster (pg. 51)	**Change:** Nova 40 W plus Maestro 75 DF at 2 kg/ha to Nova 40 W at 340 g/ha plus Maestro 80 DF at 1.90 kg/ha	
		Subsequent summer sprays (pg. 55)	**Change:** Maestro 75 DF at 4 (2)kg/ha to Maestro 80 DF at 3.75 (1.90) kg/ha	
	Sooty blotch/ fly speck	Subsequent summer sprays (pg. 55)	**Change:** Maestro 75 DF at 4.00 kg/ha to Maestro 80 DF at 3.75 kg/ha	
	Scab	Green tip up to half inch green (pg. 51)	**Replace:** Captan 50 WP and Captan 80 WP with Supra Captan 80 WDG at 3.60 kg/ha	
		Subsequent summer sprays (pg. 55)	**Replace:** Captan 50 WP and Captan 80 WP with Supra Captan 80 WDG at 3.60 (1.80) kg/ha	
	Sooty blotch/ fly speck	Subsequent summer sprays (pg. 55)	**Replace:** Captan 50 WP and Captan 80 WP with Supra Captan 80 WDG at 3.60 kg/ha	
	Spring feeding caterpillars	Tight cluster to pink (pg. 52).	**Correct:** Zolone Flo from 2.00 kg/ha to 2.00 L/ha.	
	Plum curculio	Petal Fall (pg. 54)	**Correct:** Zolone Flo from 3.00 mL/ha to 3.00 L/ha.	
	Obliqueband ed leafroller.	Full pink (pg. 53), Petal fall (pg. 54), Special sprays (pg. 56).	**Add:** comment to Confirm notes.	Accurate timing of Confirm is important, see label for specific timing.
	Codling moth	Subsequent summer sprays (pg. 55).	**Add:** comment to Confirm note.	Accurate timing of Confirm is important, see label for specific timing.
	Codling moth	Subsequent summer sprays (pg. 55)	**Correct:** Zolone Flo from 2.00 kg/ha to 2.00 L/ha.	
	Sooty blotch/ Fly speck	Subsequent summer sprays (pg. 55)	**Correct:** Zineb 80 W from 4.25 kg/ha to 3.75 kg/ha.	
	Codling moth	Subsequent summer sprays (pg. 55)	**Correct:** Sevin XLR plus from 2.30 L/ha to 3.10 L/ha.	
	Apple maggot	Subsequent summer sprays (pg. 56)	**Correct:** Diazinon 50 W from 3.25 kg/ha to 3.00 kg/ha.	
	Green and Rosy apple aphid	Special sprays (pg. 56)	**Correct:** Diazinon 50 W from 3.25 kg/ha to 3.00 kg/ha.	
	Apple maggot	Subsequent summer sprays (pg. 56)	**Correct:** Cygon 480 E from 4.25 L/ha to 3.75 L/ha.	
	Mites	Special sprays (pg. 57).	**Change:** To clarify comments for this section, reverse the order of the second and third sentence.	
	Aphids	Non Bearing Apple Calendar Summer sprays section (pg. 58)	**Delete:** Metasystox R 240 SC	

CROP	PEST	TIMING & PG #	CHANGE	COMMENTS
Blueberry	Blueberry maggot	Fruit ripening (pg. 81).	**Add:** Guthion Solupak 50 WP at the rate of 2.25 kg/ha.	
	Botrytis twig and blossom blight	First bloom (pg. 80)	**Change:** Maestro 75 DF at 2.40 kg/ha to Maestro 80 DF at 2.25 kg/ha	
	Fruit rot	Fruit ripening (pg. 80)	**Change:** Maestro 75 DF at 2.40 kg/ha to Maestro 80 DF at 2.25 kg/ha	
	Botrytis twig and blossom blight	First bloom (pg. 80)	**Replace:** Captan 50 WP and Captan 80 WP with Supra Captan 80 WDG at 2.00 kg/ha	
	Fruit rot	Fruit ripening (pg. 80)	**Replace:** Captan 50 WP and Captan 80 WP with Supra Captan 80 WDG at 2.00 kg/ha	
Raspberry	Two spotted spider mite	Post harvest — Special sprays (pg. 87)	**Add:** Pyramite 75 WP at 600 g/ha	Pyramite to be applied only after harvest.
	Leafrollers	Prebloom and Green fruit (pg. 86)	**Add:** Dipel 2X DF at 550 g/ha.	
	Raspberry fruitworm	Prebloom (pg. 86)	**Add:** Diazinon 50 W at 2.00 kg/ha and 1.00 kg/1000 L	Do not apply diazinon after first blooms open.
	Clipper weevil	Prebloom (pg. 86)	**Add:** pest to section with control. Malathion 25 W (1 day) at 9.00 kg/ha and 4.50 kg/1000 L	Small round holes in flower petals and clipped buds indicate the presence of this pest.
	Leafhopper	Green fruit (pg. 86)	**Add:** pest to section with control. Malathion 25 W (1 day) at 9.00 kg/ha and 4.50 kg/1000 L	
	Fruit rot	Bloom (pg. 86)	**Add:** to comment section	Captan will provide some control of spur blight.
	Fruit rots	Bloom (pg. 86)	**Change:** Maestro 75 DF at 2.70 kg/ha and 1.35 kg/1000 L to Maestro 80 DF at 2.50 kg/ha and 1.25 kg/1000 L.	**Replace comment** to read, Maestro 80 DF at 2.25 kg/ha for blackberry.
	Fruit rots	Bloom (pg. 86)	**Replace:** Captan 50 WP and Captan 80 WP with Supra Captan 80 WDG (2 days) at 2.40 kg/ha or 1.2 kg/1000 L except where tank mixed with Benlate	
Strawberry	Cutworms	Establishment Year after planting (pg. 92)	**Delete:** Sevin XLR Plus. Cutworm not on label for this crop.	
	Botrytis grey mould	Bearing Years at bloom; 7–10 days after first bloom; and preharvest (pg. 94).	**Correct:** Folpan 50 W from 2.25 kg/ha to 4.00 kg/ha.	
	Two-spotted spider mite	Special sprays (pg. 95)	**Add:** Pyramite at 600 g/ha (10 days)	
	Leaf spot	Establishment Year at one month after planting section (pg. 92)	**Add:** Supra Captan 80 WDG at 4.20 kg/ha. **Add:** Maestro 80 DF at 4.20 kg/ha.	Lower leaf surface coverage is essential for control of leaf spot.
	Leaf spot	Bearing Years when flower buds are visible in the crown (pg. 93) and under special sprays (pg. 95).	**Add:** Supra Captan 80 WDG (2 days) at 4.20 kg/ha. **Add:** Maestro 80 DF (2 days) at 4.20 kg/ha.	Lower leaf surface coverage is essential for control of leaf spot.
	Botrytis grey mould	Bearing Years at first bloom; 7–10 days after first bloom; and preharvest (pg. 94).	**Replace:** Captan 50 WP and Captan 80 WP with Supra Captan 80 WDG (2 days) at 4.20 kg/ha.	

CROP	PEST	TIMING & PG #	CHANGE	COMMENTS
Strawberry (cont'd)	Botrytis grey mould	Bearing Years at first bloom; 7–10 days after first bloom; and preharvest (pg. 94).	**Change:** Maestro 75 DF at 4.00 kg/ha to Maestro 80 DF at 4.20 kg/ha.	
	Cyclamen mite	Special sprays (pg. 95)	**Correct:** Thiodan 4 EC at 1.25 L/ha to 5.00 L/ha.	
Apricot	Brown rot	Prebloom and Shuck split (pg. 123).	**Replace:** Captan 50 WP and Captan 80 WP with Supra Captan 80 WDG at 1.20 kg/1000 L or 3.6 kg/ha.	
	Brown rot	Prebloom and Shuck split (pg. 123).	**Change:** Maestro 75 DF to Maestro 80 DF at 1.50 kg/1000 L or 4.50 kg/ha	
	Leafrollers	Special sprays (pg. 123).	**Add:** pest to section with control. Dipel 2X DF at 1.12 kg/ha.	
	Plum curculio	Shuck split (pg123)	**Correct:** Parathion 15 WP from 1.50 g/1000 L or 4.50 kg/ha to 1.75 kg/1000 L or 5.25 kg/ha.	
	Plum curculio	Shuck-split (pg. 123)	**Delete:** reference to Guthion 50 WP.	
Sour cherry	Brown rot	Bloom (pg. 125).	**Correct:** Funginex 190 EC from 2.50 kg/ha to 2.50 L/ha	
	Powdery mildew	Post harvest (pg. 126).	**Correct:** Benlate 50 WP from 1.10 kg/ha to 1.75 kg/ha	
	Brown rot	Bloom (pg. 125).	**Delete:** Sulphur 92 WP	
	Brown rot	Bloom (pg. 125).	**Add:** Kumulus DF at 22.50 kg/ha	
	Powdery mildew	Second cover (pg. 126).	**Delete:** Sulphur 92 WP	
	Powdery mildew	Second cover (pg. 126).	**Add:** Kumulus DF at 12.00 kg/ha	Change the word Sulphur to Kumulus in the comments section.
	Brown rot	Bloom (pg. 125).	**Replace:** Captan 50 WP and Captan 80 WP with Supra Captan 80 WDG at 4.50 kg/ha.	
	Leaf spot	Petal fall (pg. 125).	**Replace:** Captan 50 WP and Captan 80 WP with Supra Captan 80 WDG at 4.50 kg/ha except where tank mixed with Benlate.	
	Brown rot	Shuck (pg. 125)	**Replace:** Captan 50 WP and Captan 80 WP with Supra Captan 80 WDG at 4.50 kg/ha.	
	Leaf spot	Post harvest (pg. 126).	**Replace:** Captan 50 WP and Captan 80 WP with Supra Captan 80 WDG at 4.50 kg/ha except where tank mixed with Benlate.	
	Brown rot	Bloom (pg. 125).	**Change:** Maestro 75 DF at 4.75 kg/ha to Maestro 80 DF at 4.50 kg/ha.	
	Leaf spot	Petal fall (pg. 125).	**Change:** Maestro 75 DF at 4.75 kg/ha to Maestro 80 DF at 4.50 kg/ha.	
	Brown rot	Shuck (pg. 125).	**Change:** Maestro 75 DF at 4.75 kg/ha to Maestro 80 DF at 4.50 kg/ha.	
	Leaf spot	Post harvest (pg. 126).	**Change:** Maestro 75 DF at 4.75 kg/ha to Maestro 80 DF at 4.50 kg/ha.	

CROP	PEST	TIMING & PG #	CHANGE	COMMENTS
Sweet cherry	Brown rot	Bloom (pg. 128).	**Correct:** Funginex 190 EC from 2.50 kg/ha to 2.50 L/ha	
	Brown rot	Bloom; Shuck fall; second cover; and Pre-pick; (pg. 128, 129).	**Delete:** Sulphur 92 WP	
	Black cherry aphid	Petal fall (128).	**Correct:** Zolone Flo from 2.75 kg/ha to 2.00 L/ha.	
	Plum curculio	Shuck fall (pg. 128).	**Correct:** Zolone Flo from 2.75 kg/ha to 2.00 L/ha.	
	Plum curculio	Second cover (pg. 129).	**Correct:** Zolone Flo from 2.75 kg/ha to 2.00 L/ha.	
	Leaf spot	Post harvest (pg. 129).	**Correct:** Ferbam 76 WDG from 9.00 kg/ha to 6.00 kg/ha.	
	Brown rot	Bloom; Shuck fall; second cover; Pre-pick; and Post harvest (pg. 128, 129).	**Change:** Maestro 75 DF at 4.75 kg/ha to Maestro 80 DF at 4.50 kg/ha.	
	Brown rot	Bloom; Shuck fall; second cover; Pre-pick; and Post harvest (pg. 128, 129).	**Replace:** Captan 50 WP and Captan 80 WP with Supra Captan 80 WDG at 4.50 kg/ha.	
Peach and Nectarine	Brown rot	Pink through bloom; 1st, 2nd, and 3rd generation OFM; Prepick; and special (pg. 130–133).	**Correct:** Sulphur 92 WP from 20.25 kg/ha to 19.50 kg/ha.	
	Peach tree borer	1st generation OFM (pg. 131).	**Delete:** Endosulfan 400 EC.	
	Brown rot	Pink through bloom; 1st, 2nd, and 3rd generation OFM; and Prepick (pg 130–133).	**Change:** Maestro 75 DF at 4.00 kg/ha to Maestro 80 DF at 4.50 kg/ha.	
	Brown rot	Pink through bloom; 1st, 2nd, and 3rd generation OFM; and Prepick (pg. 130 –133).	**Replace:** Captan 50 WP and Captan 80 WP with Supra Captan 80 WDG at 3.6 kg/ha.	
	Lesser peach tree borer	throughout calendar for protecting young non-bearing peach trees (pg. 133, 134).	**Delete:** Endosulfan 400 EC throughout peach calendar.	
Pear	Mites	Summer sprays (pg. 140).	**Add:** Pyramite at 300 g/ha	Maximum of 1 application per year. Pre-harvest interval is 25 days.
	Leafrollers	Prebloom; 1st cover; special sprays (pg. 138 to 140).	**Change:** Dipel WP at 2.25 kg/ha to Dipel 2X DF at 1.12 kg/ha	
	Scab	Green tip (pg. 138).	**Change:** Maestro 75 DF at 4.00 kg/ha to Maestro 80 DF at 3.75 kg/ha.	
	Scab	Green tip (pg. 138).	**Replace:** Captan 50 WP and Captan 80 WP with Supra Captan 80 WDG at 3.6 kg/ha.	
	Sooty blotch	Second cover (pg. 140).	**Change:** Maestro 75 DF at 4.00 kg/ha to Maestro 80 DF at 3.75 kg/ha.	
	Sooty blotch	Second cover (pg. 140).	**Replace:** Captan 50 WP and Captan 80 WP with Supra Captan 80 WDG at 3.6 kg/ha.	
Plum	Peach tree borer	Special spray section (pg. 145).	**Delete:** Endosulfan 400 EC	
	Plum curculio	Shuck	**Correct:** Parathion 15 WP from 3.25 kg/ha to 5.25 kg/ha.	
	Brown rot	Prebloom, Shuck, & 2nd cover (pg. 144).	**Change:** Maestro 75 DF at 4.00 kg/ha to Maestro 80 DF at 3.75 kg/ha.	

CROP	PEST	TIMING & PG #	CHANGE	COMMENTS
	Brown rot	Prebloom, Shuck, & 2nd cover (pg. 144).	**Replace:** Captan 50 WP and Captan 80 WP with Supra Captan 80 WDG at 3.6 kg/ha.	
Plum (cont'd)	Black knot	Prebloom and Shuck (pg. 144).	**Change:** Maestro 75 DF at 4.00 kg/ha to Maestro 80 DF at 3.75 kg/ha.	
	Black knot	Prebloom and Shuck (pg. 144).	**Replace:** Captan 50 WP and Captan 80 WP with Supra Captan 80 WDG at 3.6 kg/ha.	
	Apple maggot	Special sprays (pg. 145)	**Delete:** Guthion 50 WP, APM 50 W and Sniper 50 W	

- The re-entry period for azinphos-methyl products (Guthion Solupak, Sniper and APM) have been changed depending on the task. See product label.

- **CHANGE** Days to Harvest interval for Sniper, Guthion and APM to 14 days for Apple, Pear and Raspberry (Table 13-3, pg. 214)

- **CHANGE** all references of Guthion 50 W in the Apple, Grape, Sour and Sweet Cherry, Peach, Pear, Plum and Tree Nut calendars to Guthion Solupak 50 WP.

- **ADD** Pyramite days to harvest intervals for Pear (25) and Strawberry (10) to Table 13-3, on pg. 214.

- **ADD** Sovran to Table 13-3 on pg. 214 with days to harvest interval of 30 days for Apple.

- **CHANGE** the manufacturer/Agent code for Funginex from CYC to BAZ on pg. 208 and for Ripcord from CYC to BAZ on pg. 210.

REPLACE PAGES 105 TO 108 WITH NEW MATERIAL BELOW.

Grape Calendar

Read the label and follow all safety precautions.
Some grape varieties are sensitive to Sulphur, Dikar, Dikar plus Zolone, Thiodan or Copper.
See OMAFRA Publication 360 *Fruit Production Recommendations* Table 9-4 on pg. 111 for specific information.

To delay development of resistance to NOVA do not apply in consecutive applications (alternate with other products between sprays of Nova) and never apply more than three times per season. **DO NOT USE BELOW LABEL RATES.**

Avoid repeated applications of synthetic pyrethroids, such as Cymbush and Pounce. See OMAFRA Publication 360 *Fruit Production Recommendations* Pest Resistance to Insecticides, Fungicides, Miticides on pg. 26 for more information.

Be aware that many processors may need longer preharvest intervals than stated on product labels. Contact processors directly regarding their preharvest interval policy. Some processors also have special restrictions for certain pest control products, for example, number of applications or no application after a certain crop stage. Consult the contract purchaser of your grapes for more details.

Where the label allows, the pesticide rates per hectare have been calculated based on water volumes that reflect changes in canopy development during the season. Calculations are based on dilute water volume guidelines of:

- 1700 L/ha during the period of shoot development up to "Inflorescence fully developed with floret separation";
- 2200 L/ha for "End of flowering to fruit set";
- 2800 L/ha at full canopy development at "Berries — Pea Sized". (Assume full rate of product per hectare at this time).

While these water volumes may be larger than what is used today with modern sprayers further adjustments of pesticide rates are not recommended. Reducing pesticide rates per hectare below those listed in this publication may result in poor pest control and contravene manufacturer liabilities for performance.

Diseases and Insects	Materials	Amount per Hectare	Comments
First Leaf — 1.25 cm TO 5.0 cm shoot length (Amounts/hectare are based on a dilute water volume of 1700 L/ha).			
Phomopsis cane and leaf spot	Supra Captan 80 WDG or Maestro 80 DF Folpan 50 WP	2.00 kg 2.00 kg 3.50 kg	Begin spraying susceptible varieties early where there has been a history of phomopsis and conditions are wet. Apply in high water volume to ensure complete coverage.
3-5 Leaves unfolded —10 to 15 cm shoot length (Amounts/hectare are based on a dilute water volume of 1700 L/ha).			
Phomopsis cane and leaf spot	Supra Captan 80 WDG or Maestro 80 DF Folpan 50 WP	2.00 kg 2.00 kg 3.50 kg	Begin spraying susceptible varieties early where there has been a history of phomopsis and conditions are wet. Apply in high water volume to ensure complete coverage.
Black rot	Nova 40 WP Ferbam 76 WDG Benlate 50 WP	200 g 3.50 kg 1.00 kg	
Powdery mildew	Nova 40 WP Dikar WP Sulphur 92 WP or Kumulus 80 DF Benlate 50 WP	200 g 5.50 kg 7.50 kg 7.10 kg 1. 00 kg	This spray is important to protect expanding leaves and developing fruit clusters from infections. Intervals between sprays need to be about 7–10 days. Under rainy conditions, intervals may need to be shortened to 7 day intervals. Do not use Nova more than 3 times per season.
Shoot Length — 20 to 25 cm (Amounts/hectare are based on a dilute water volume of 1700 L/ha).			
Phomopsis cane and leaf spot,	Supra Captan 80 WDG or Maestro 80 DF Folpan 50 WP	2.00 kg 2.00 kg 3.50 kg	Begin spraying susceptible varieties early where there has been a history of phomopsis and conditions are wet. Apply in high water volume to ensure complete coverage.
Black rot	Nova 40 WP Ferbam 76 WDG Benlate 50 WP	200 g 3.50 kg 1.00 kg	

Downy mildew	Ridomil Gold MZ 68 WP	2.50 kg	If bloom is delayed or if wet weather is expected, repeat this application. Ridomil Gold MZ may be used only once per season and only prior to bloom.
	Dithane M45 80 WP	3.40 kg	
	or Manzate 200 80 WP	6.75 kg	
	Dikar WP	5.50 kg	
	Polyram 80 DF	3.50 kg	
	Maestro 80 DF	2.00 kg	
	or Supra Captan 80 WDG	2.00 kg	
	Folpan 50 WP	3.50 kg	
Powdery mildew	Nova 40 WP	200 g	This spray is important to protect expanding leaves and developing fruit clusters from infections. Intervals between sprays need to be about 7–10 days. Under rainy conditions, intervals may need to be shortened to 7 day intervals. **Do not use Nova more than 3 times per season and do not use in consecutive applications.**
	Dikar WP	5.50 kg	
	Sulphur 92 WP	7.50 kg	
	or Kumulus 80 DF	7.10 kg	
	Benlate 50 WP	1.00 kg	
Inflorescence Fully Developed (flower cluster with floret separation) (Amounts/hectare are based on a dilute water volume of 1700 L/ha).			
Grape berry moth (1st generation)	[4]Guthion Solupak 50 WP	2.10 kg	Where there has been a history of early season grape berry moth injury , an application of an insecticide for first generation may prove to be economically beneficial. Apply in high water volumes to ensure complete coverage.
	or [4]Guthion 240 SC	4.25 L	
	or [4]APM 50 W	2.10 kg	
	or [4]Sniper 50 W	2.10 kg	
	Isomate GBM	1000 dispensers	**Mating Disruption:** Vineyard block treated with either product must be larger than 2 ha for treatment.
	3M Sprayable Pheromone	75 mL	*i) Isomate GMB:* Apply Isomate GBM in late April or early May prior to 1st catch and flight and mating of grape berry moth (GBM) adult moths.
	Imidan 50 WP	1.90 kg	
	Diazinon 50 W	1.70 kg	*ii) 3M Sprayable Pheromone:* Apply the 1st application of 3M Sprayable Pheromone for grape berry moth (GBM) control in late April or early May prior to 1st capture of moths in pheromone-baited traps, flight and mating of GBM moths. Pheromone application must be made when a total of 5 moths have been caught in 5 traps during 2 consecutive inspections (traps checked every 3–4 days). Delayed application will result in increased mating and reduced control. The capture of moths in traps should remain at or near zero after application. Re-apply at 14–21 day intervals during adult flight periods to ensure continued mating disruption of GBM. Isomate GBM and 3M Sprayable Pheromone are specific for GBM and will not control other pests. Insect monitoring and sampling must be carried out throughout the season to ensure that GBM is being adequately controlled and to determine if special sprays are necessary for other sporadic pests such as leafhoppers. For more information see note on mating disruption, pg. 109 of Publication 360 *Fruit Production Recommendations.*
	Sevin XLR Plus	5.25 L	
	Cymbush 250 EC	240 mL	
	Pounce 384 EC	360 mL	
			Warning: Under slow drying conditions or at temperatures above 30°C, any spray material or combinations are likely to cause some degree of injury.
			[4] *Minimum period for reentry is 48 hrs. See product label for specific reentry requirements and precautions.*
Downy mildew	Ridomil Gold MZ 68 WP	2.50 kg	If bloom is delayed or if wet weather is expected, repeat the application. Ridomil Gold MZ may be used only once per season and only prior to bloom. This spray is important to protect expanding leaves and developing fruit clusters from infections. Fruit clusters are highly susceptible to downy mildew during the bloom to pea-sized berries.
	Dithane M45 80 WP	3.40 kg	
	or Manzate 200 80 WP	6.75 kg	
	Dikar WP	5.50 kg	
	Polyram 80 DF	3.50 kg	
	Maestro 80 DF	2.00 kg	
	or Supra Captan 80 WDG	2.00 kg	
	Folpan 50 WP	3.50 kg	
Powdery mildew	Nova 40 WP	200 g	This spray is important to protect expanding leaves and developing fruit clusters from infections. Fruit clusters are highly susceptible to powdery mildew from bloom to pea-sized berries. Intervals between sprays should be 7 days. Under rainy conditions, intervals may need to be shortened. 7 day intervals over the bloom period would be ideal. Do not use Nova in consecutive sprays and no more than 3 times per season.
	Dikar WP	5.50 kg	
	Sulphur 92 WP	7.50 kg	
	or Kumulus 80 DF	7.10 kg	
	Benlate 50 WP	1.00 kg	
Black rot	Nova 40 WP	200 g	This spray is important to protect expanding leaves and developing fruit clusters from infections. Fruit clusters are highly susceptible to black rot from bloom to pea-sized berries stage.
	Ferbam 76 WDG	3.50 kg	
	Benlate 50 WP	1.00 kg	

Do not apply insecticides while grapes are in bloom.

See Bee Poisoning, pg. 41, Publication 360, *Fruit Production Recommendations.*

End of Late Flowering to Early Fruit Set Stage (Amounts/hectare are based on a dilute water volume of 2200 L/ha).

Leafhoppers	[4]Guthion Solupak 50 WP	2.75 kg	Grape leafhopper (GLH) and potato leafhopper (PLH) are the two main species that feed on grapes. GLP causes pale white stippling along the veins. In some vineyards, Guthion or APM no longer give control. PLH feeding causes the leaves to yellow along the margins. Leaves cup upwards and later develop marginal necrosis. All products listed provide control of PLH.
	or [4]Guthion 240 SC	5.50 L	
	or [4]APM 50 W	2.75 kg	
	or [4]Sniper 50 W	2.75 kg	
	Sevin XLR Plus	6.00 L	
	Diazinon 50 W	2.20 kg	
	Cymbush 250 EC	240 mL	[4] *Minimum period for reentry is 48 hrs. See product label for specific reentry requirements and precautions.*
	Pounce 384 EC	175 mL	
Grape phylloxera (leaf form)	Thiodan 50 WP	2.20 kg	Only French hybrid and vinifera varieties are susceptible to this pest.
	or Endosulfan 50 W	2.20 kg	
Downy mildew	Ridomil-Copper 70 WP	2.20 kg	Spray all varieties for mildew at this time. Ridomil-Copper may cause injury to many varieties under cool, slow drying conditions. Do not use Ridomil-Copper mixtures in combination with other products; do not use more than 3 times per season.
	plus Lime	3.50 kg	
	Dithane M45 80 WP	4.40 kg	
	or Manzate 200 80 WP	6.75 kg	
	Dikar WP	5.50 kg	
	Polyram 80 DF	4.50 kg	
	Maestro 80 DF	2.75 kg	
	or Supra Captan 80 WDG	2.75 kg	
	Folpan 50 WP	4.50 kg	
Black rot	Nova 40 WP	200 g	
	Folpan 50 WP	4.50 kg	
	Supra Captan 80 WDG	2.75 kg	
	or Maestro 80 DF	2.75 kg	
	Polyram 80 DF	4.50 kg	
Powdery mildew	Nova 40 WP	200 g	This spray is important to protect expanding leaves and developing fruit clusters from infections. Fruit clusters are highly susceptible to powdery mildew from bloom to pea sized-berries stage . Young developing fruit and leaves are very susceptible at this stage. It is important that protectant coverage be maintained. Intervals between sprays should be 7 days. Under rainy conditions intervals may need to be shortened. Do not use Nova in consecutive sprays or more than 3 times per season.
	Sulphur 92 WP	10.00 kg	
	or Kumulus 80 DF	9.20 kg	
	Dikar WP	5.50 kg	
	Benlate 50 WP	1.20 kg	
Botrytis bunch rot	See comments for Botrytis bunch rot control under **Berry Touch to Cluster Closure.**		

Berries Pea-sized (Amounts/hectare are based on a dilute water volume of 2800 L/ha).

Grape berry moth (2nd generation)	[4]Guthion Solupak 50 WP	3.50 kg	Where berry moth is a regular problem, apply one of these materials in high water volumes to ensure complete coverage. *Mating Disruption:* Vineyard block must be larger than 2 ha for treatment. *i) Isomate GBM:* Apply second application of Isomate GBM dispensers 60 days after the first application (about late June or early July) but before significant second flight of grape berry moth (GBM). *ii) 3M Sprayable Pheromone:* Apply 3M Sprayable Pheromone for grape berry moth (GBM) control before flight of second generation begins. Apply no later than when a total of 5 moths have been caught in 5 traps during two consecutive inspections (traps checked every 3–4 days). Delayed application will result in incresed mating and reduced control. Moth trap catches should remain at or near zero after application. Re-apply at 14-21 day intervals during adult flight periods to ensure continued disruption of GBM. Isomate GBM and 3M Sprayable Pheromone are specific for GBM and will not control other pests. Insect monitoring and sampling must be carried out throughout the season to ensure that GBM is being adequately controlled and to time special sprays for other sporadic pests such as leafhoppers. For more information see note on mating disruption, pg. 109 of OMAFRA Publication 360, *Fruit Production Recommendations.* [4] *Minimum period for reentry is 48 hrs. See product label for specific reentry require ments and precautions.*
	or [4]Guthion 240 SC	7.00 L	
	or [4]APM 50 W	3.50 kg	
	or [4]Sniper 50 W	3.50 kg	
	Isomate GBM	1000 dispensers	
	3M Sprayable Pheromone	75 mls	
	Imidan 50 WP	3.10 kg	
	Diazinon 50 W	3.37 kg	
	Sevin XLR Plus	6.40 L	
	Cymbush 250 EC	240 mL	
	Pounce 384 EC	360 mL	

Phylloxera (leaf form)	Repeat as in End of Late Flowering to Early Fruit Set Stage.		
Powdery mildew	Nova 40 WP	200 g	Do not use Nova in consecutive sprays, alternate between Nova sprays with other effective products. Nova should not be used more than 3 times per season. These 2 points are key components in a resistance management strategy.
	Dikar WP	5.50 kg	
	Sulphur 92 WP	12.60 kg	
	or Kumulus 80 DF	12.60 kg	
	Benlate 50 WP	1.50 kg	
Downy mildew	Dikar WP	5.50 kg	Ridomil-Copper may cause injury to many varieties under cool, slow drying conditions. Do not use Ridomil-Copper mixtures in combination with other products. Do not use more than 3 times per season.
	Folpan 50 WP	5.50 kg	
	Supra Captan 80 WDG	3.50 kg	
	or Maestro 80 DF	3.50 kg	
	Polyram 80 DF	5.50 kg	
	Dithane M45 80 WP	5.50 kg	
	Ridomil/Copper 70 WP	2.20 kg	
	plus lime	3.50 kg	
Black rot	Nova 40 WP	200 g	For effective control, apply in high water volumes to ensure coverage.
	Ferbam 76 WDG	5.60 kg	
	Benlate 50 WP	1.50 kg	
	Folpan 50 WP	5.50 kg	
	Supra Captan 80 WDG	3.50 kg	
	or Maestro 80 DF	3.50 kg	
	Polyram 80 DF	5.50 kg	
Berry Touch to Cluster Closure (Amounts/hectare are based on a dilute water volume of 2800 L/ha).			
Powdery mildew	Nova 40 WP	200 g	
	Sulphur 92 WP	12.60 kg	
	or Kumulus 80 DF	12.60 kg	
	Dikar WP	5.50 kg	
	Benlate 50 WP	1.50 kg	
Botrytis bunch rot	Rovral 50 WP	1.50 kg	Direct this spray at the fruiting zone. Many of the vinifera and vinifera hybrid varieties with tight clusters are susceptible to Botrytis bunch rot e.g., Gamay Noir, Pinot Noir, Pinot Gris, Riesling, Chardonnay, Chancellor, and Seyval Blanc. These susceptible varieties may require more than one application during the bunch closure period. For Elevate use Agral 90 at 200 mL per 1000 L of water (0.02% v/v) with the product in the tank. Do not apply Elevate if rainfall is expected within 6 hrs. after application. Do not apply Vangard within 30 m of lakes, streams and ponds. **RESISTANCE MANAGEMENT:** Because all of these products have a high risk of selecting fungicide resistant populations of Botrytis, the following steps should be taken to avoid rapid development of resistance: • Do not apply any product more than once in a season. • never use a product in consecutive or back to back sprays • do not cut label rates. To maximize the effectiveness of all products: • direct the full recommended spray rate to the fruiting zone of the grape canopy for best disease control • use a minimum of 1000 L/ha (100 gal/acre) of water or sufficient water to provide good coverage of the fruiting zone and apply as a special separate cover spray. [1] *Minimum period for reentry is 4 hrs. See product label for specific reentry requirements and precautions.* [4] *Minimum period for reentry is 48 hrs. See product label for specific reentry requirements and precautions.*
	[4]Vangard 75 WG	750 g	
	[1]Elevate 50 WDG	1.10 kg	
Mites	Pyramite 75 WP	300 g	Use either miticide only once per season and alternate if possible.
	Kelthane 50 W	2.00 kg	

Beginning of Ripening (veraison period) (Amounts/hectare are based on a dilute water volume of 2800 L/ha).			
Grape Berry Moth	3M Sprayable Pheromone	75mL	Applications for control of 2nd and 3rd generation control should be continuous over the period of adult flight without breaks in intervals. Delayed application will result in incresed mating and reduced control. Moth trap catches should remain at or near zero after application. Re-apply at 14-21 day intervals during adult flight periods to ensure continued disruption of GBM. Vineyard treated blocks must be larger than 2 ha for treatment. 3M Sprayable Pheromone is specific for GBM and will not control other pests. Insect monitoring and sampling must be carried out throughout the season to ensure that GBM is being adequately controlled and to time special sprays for other sporadic pests such as leafhoppers. For more information see note on mating disruption, OMAFRA Publication 360, *Fruit Production Recommendations*, pg. 109.
Powdery mildew	Use one of the materials listed under **Berry Touch to Cluster Closure** . Check for interval to harvest.		Vinifera and french hybrid varieties are more susceptible and may require extra sprays. Do not use Nova as an eradicant when powdery mildew is already a severe problem. For good resistance management, do not use Nova at this time.
Downy mildew	Use one of the materials listed under **Berries Pea-sized.**		Ridomil-Copper may cause injury to many varieties under cool, slow drying conditions. Do not use more than 3 times/season. Ridomil-Copper mixtures should not be used in combination with other products.
Grape berry moth about Aug. 20	Use one of the materials listed under **Berries Pea-sized.**		Check the interval to harvest. A spray may be needed on late varieties to control the brood which emerges in late Aug. Border sprays of conventional insecticides may be very effective. For 3M sprayable pheromone spray the entire block.
Botrytis bunch rot	[4]Vangard 75 WG [1]Elevate 50 WDG Rovral 50 WP	750 g 1.10 kg 1.50 kg	In years when late summer or fall weather conditions are wet and humid, additional sprays to protect against Botrytis may be necessary during the ripening or veraison period. This is especially important for vineyards designated for late harvest or ice wine. For further information on product choice and use, see comments under **Berry Touch to Berry Closure.** [1] *Minimum period for reentry is 4 hrs. See product label for specific reentry requirements and precautions.* [4] *Minimum period for reentry is 48 hrs. See product label for specific reentry requirements and precautions.*
Post Harvest (Amounts/hectare are based on a dilute water volume of 2800 L/ha).			
Hardening-off Vines	Copper sulphate plus Lime Copper 53 WP plus Lime	4 kg/1000L 6 kg/1000L 3 kg/1000L 6 kg/1000L	Some premature defoliation may be observed, but is not likely to affect vine vigour. Rates for copper and lime are given as rates per 1000 litres of water. Post harvest applications of Copper assist in maturing the new wood which has often helped increase the winter hardiness of the canes. 2 applications or more may be necessary in high vigour and/or young plantings. Use sufficient water volume to ensure complete coverage of the vine. See OMAFRA Publication 360, *Fruit Production Recommendations, Use of Copper Products on Fruit Crops*, pg. 34 for information on how to mix copper sprays.

Visit the grape page on the OMAFRA web site at

http://www.gov.on.ca/OMAFRA/english/crops/hort/grape.html

ADDITIONS TO CHAPTER 12

There have been many additions and improvements in the *Precautions and Use Directions* listed for each herbicide treatment. See the 2001 edition of Publication 75, Guide to Weed Control for the complete version.

Active Ingredient TRADE NAME (Formulation)	RATE (active) PRODUCT PER HA	RATE PRODUCT PER ACRE	PRECAUTIONS For more information, see Chapter 4: Notes on Herbicides and Chapter 5: Notes on Adjuvants.
pg. 190 Blueberries (Highbush): Established Plantings (Postemergent Broadleaf Herbicides)			
bentazon BASAGRAN plus oil concentrate ASSIST	0.84 kg/ha 1.75 L/ha	0.7 L/ac	• For top growth control of yellow nut sedge. • Make 2 applications 7–10 days apart, when weeds are small. • **Do NOT** apply more than 2 times per year. • **Do NOT** apply closer than 25 days to harvest.
pg 195 Strawberries: Planting and Harvesting Year (Postemergent Grass Herbicides)			
2–6 Weeks After Planting, Late Summer/Fall (Labour Day), Spring After Mulch Removal, Renovation			
POSTEMERGENCE — Leaf stage of the weeds is critical for good weed control. Smaller weeds are generally easier to kill but there needs to be enough leaf surface to intercept the herbicide. Apply according to recommended leaf stages. Crop stage is important to optimize crop safety. Always use appropriate drift management technology.			
sethoxydim POAST ULTRA (450g/L) plus surfactant/solvent MERGE	0.15 to 0.5 kg/ha 0.32 to 1.1 L/ha 1 to 2 L/ha	 0.13 to 0.45 L/ac 0.4 to 0.8 L/ac	• Apply to actively growing grasses. • For annual grass, use 0.32 L/ha. Apply at the 1–6 leaf stage (2–5 is optimum). • For volunteer grains, use 0.47 L/ha. Apply at the 1–6 leaf stage (2–5 is optimum). • For quackgrass, use 1.1 L/ha. Apply up to the 3 leaf stage. Thorough preplant tillage will ensure more uniform quackgrass emergence. Cultivate after 7 days. Use the high rate of MERGE for quackgrass. • Use 100–200 L water/ha (40–80 L water/ac). • Grasses emerging after application will not be controlled. • Spray tips angled forward 45° will give better coverage. • **Do NOT** use flood jet or hollow cone nozzles. • **Do NOT** apply if rain is expected within one hour after application. • **Do NOT** apply closer than 25 days to harvest.
Strawberries: Planting and Harvesting Year (Postemergent Grass & Broadleaf Herbicides)			
Renovation, Late Summer/Fall (Labour Day)			
paraquat GRAMOXONE (200g/L)	1.1 kg/ha 5.5 L/ha	2.2 L/ac	• Apply to narrow strawberry rows and remove weeds between the rows. • Apply in 550–1100 L/ha water (220–440 L/ac). • Apply on a calm day. • Use shields with low pressure and a spray nozzle arrangement to avoid drift. • Complete coverage is important. Use higher water volumes on dense vegetation. • Perennial weeds will only be suppressed. • Only emerged weeds will be controlled.

ADD TO CHAPTER 8, PAGE 76–77

Leaf Analysis for Summer-Bearing Raspberry

Leaf analysis can be a helpful tool for raspberries when used in combination with a soil analysis. A good time to take leaf samples for analysis is shortly after completing harvest, in mid-summer, and no later than mid-August. Randomly select 50 leaves from the primocanes. Collect the youngest fully expanded leaf blade. For more information on how to complete a leaf analysis refer to OMAFRA Factsheet *Leaf analysis for fruit crop nutrition* (Order No. 91-012). The table below notes the nutrient ranges for summer bearing raspberry leaves.

Table 1: Nutrient Ranges for Summer Bearing Red Raspberry Leaves

		%		
N	P	K	Ca	Mg
2.0-3.5	0.2-0.5	1.0-2.0	0.8-2.5	0.25-0.5

		ppm		
Mn	Fe	Zn	Cu	B
20-200	25-200	15-100	5.0-20	20-60

When you review the leaf analysis results, keep in mind that these numbers represent a "snapshot" of nutrient levels at the time of sampling. A number of factors at the time of sampling can affect the reported values.

REPLACE TABLE 13-4 (PG 216) WITH TABLE BELOW

Table 13-4. Pesticide Manufacturers/Agents

ABT	Abbott Laboratories Ltd	1-905-659-0886
AMV	Amvac Chemicals Corp	1-323-264-3910
ARV	Agrevo Canada Inc	1-888-283-6847
APB	Applied Biochemists Inc	1-800-558-5106
BAT	Bartlett, N.M. Inc	1-800-263-1287
BBB	Bayer Inc	1-800-268-1331
BAZ	Basf Canada Inc	1-877-371-2273
CNV	Cheminova	1-888-316-6260
CYC	Basf Canada Inc	1-877-371-2273
DWE	Dow Agro Science Canada	1-800-667-3852
DUQ	Dupont Canada Inc.	1-800-667-3925
EFA	Elf Atochem of Canada	1-905-827-9841
ENG	Engage Agro Corp	1-800-900-5487
GLC	Great Lakes Chemical Corp	1-800-428-7947
GOW	Gowan Company	1-520-783-8844
GRN	Griffin Corp	1-912-242-8635
HOK	Hacco Inc.	1-608-221-6200
INT	Interprovincial Coop Ltd	1-204-233-3461
LPH	Lipha Tech	1-414-351-1476
MKC	Makhteshim	1-416-233-1496
MOL	Monsanto	1-800-667-4944
NRA	Norac Concepts	1-613-841-2907
NUF	Nufarm	1-800-868-5444
NUG	Nu-gro Corp	1-800-461-7356
NVT	Syngenta Crop Protection	1-800-797-5040
RHQ	Rhone-Poulenc Canada Inc	1-800-891-8291
ROH	Rohm and Haas Canada Inc.	1-800-268-4201
TOA	Tomen Agro Inc	1-415-536-3480
UNR	Uniroyal Chemical Ltd	1-800-265-2157
UAG	United Agri Products	1-800-265-4624
WBR	Wilbur-Ellis Co. Canada	1-559-442-1220
ZNA	Syngenta Crop Protection	1-800-797-5040

Note: The 3-letter manufacturer's codes represent the codes listed in Table 3-1, page 206–211, of OMAFRA Publication 360, *Fruit Production Recommendations.*

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Phone: (877) 424-1300 or (519) 826-4047
Fax: (519) 826-7610
E-mail: ag.info@omafra.gov.on.ca
Address: 1 Stone Road West, Guelph Ontario N1G 4Y2

Provides province wide, toll free technical and business information to commercial farms, agri-businesses and rural businesses.

A complete list of Ontario Ministry of Agriculture, Food and Rural Affairs — Crop Technology Staff is available on our **Web site** at www.gov.on.ca/OMAFRA/english/crops

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Each year the appropriate sub-committee of the Ontario Pest Management Research and Services Committee reviews the pesticides listed in this publication. To the best knowledge of the sub-committee, all of these pesticides were:

- federally registered
- reviewed by the Ontario Pesticides Advisory Committee (OPAC) and
- classified by the Ministry of the Environment as of November 2000

Discard old editions of this publication.

The information in this publication is general information only. All pesticides must be used in accordance with the product label and Regulation 914 under Ontario's *Pesticides Act.*

Pay close attention to all instructions and warnings on the pesticide label.

By printing this publication, the Ministry of Agriculture, Food and Rural Affairs does not offer any warranty or guarantee, nor does it assume any liability for any crop loss, animal loss, health, safety or environmental hazard caused by the use of a pesticide mentioned in this publication.

Policy Statement

In this publication, most recommendations list several pesticides that can be used for each pest discussed. In general the least hazardous materials and those growers have used satisfactorily for years are listed first. More toxic pesticides and/or newer ones with less practical grower experience follow. In some cases, the most effective pesticides are highly toxic.

This publication lists a number of brand names of pesticides. This is for the grower's convenience only. It is neither an endorsement of the product nor a suggestion that similar products are ineffective.

Weather and other factors influence the effectiveness of pesticides and the likelihood of crop injury by pest control chemicals. Consult the product label and other information regarding compatibility with other materials, the effect of environmental conditions, and so on for the specific product being considered. Wettable or soluble powders (WP, SP, WDG or DG) are less likely to cause plant injury than liquid concentrates (EC, SC and F).

Health Canada has established maximum residue limits (MRLs) for pesticides. However, growers should be aware that processors or retailers may demand more restrictive limits. Growers should seek advice of their intended market as to which restrictions or limitations apply. Growers are also encouraged to keep accurate and up to date records on pesticide use in each crop.

Federal Registration and Provincial Classification

The Ministry of the Environment administers Ontario's *Pesticides Act* and Regulation 914.

All pesticides sold and used in Ontario must be:

- registered under the federal *Pest Control Products Act,* and
- classified under the provincial *Pesticides Act* by being placed in one of six schedules of the Ontario regulation.

Federal Registration

The Pest Management Regulatory Agency (PMRA) of Health Canada grants registration following an evaluation of scientific data to ensure that the product has merit and value; and the human health and environmental risks associated with its proposed use are acceptable.

1. Full Registration

Pesticide registrations are normally granted for a period of five years, subject to renewal.

2. Temporary Registration

Temporary registration may be granted for a period not to exceed one year, where the registrant agrees to produce additional scientific or technical information, or the pesticide is used for emergency control of a serious pest outbreak.

For more information on the federal registration system contact the PMRA at 1-800-267-6315 or www.hc-sc.ca/pmra-arla.

Provincial Classification

There are six classification schedules in Regulation 914. Pesticide products are classified based on their toxicity, environmental or health hazard, persistence of the active ingredient or its metabolites, concentration, and usage. This system regulates the distribution, availability and use of pesticide products in Ontario. For up-to-date information on the regulatory status of these or other pesticides contact the:

Ontario Pesticides Advisory Committee (OPAC),
2300 Yonge St., Suite 1203, Toronto, ON, M4P 1E4
Telephone (416) 314-9230 Fax (416) 314-9237
www.opac.gov.on.ca

Farmer Certification

Regulation 914 of the *Pesticides Act* makes it mandatory for farmers to be certified through the Grower Pesticide Safety Course to buy and use Schedules 1, 2 or 5 pesticides on land they farm. There must be at least one Certified Grower for each farm operation.

As of January 2000, all assistants must receive formal pesticide safety training, recognized by the Ministry of the Environment, before they can use Schedule 2 or 5 pesticides under the supervision of a Certified Grower. This applies to all assistants — including family members, farm employees and seasonal workers.

For more information check the Ontario Pesticide Education Program Web site at www.ridgetownc.uoguelph.ca/opep/ or call **1-800-652-8573 or (519) 674-1580**

Cette publication est aussi disponible en français.

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